

CLAIMS

We claim:

1. Colored infrared-reflective roofing granules comprising base particles coated with a cured coating composition comprising a coating binder and at least one colored, infrared-reflective pigment.
2. Colored infrared-reflective roofing granules according to claim 1, the colored infrared-reflective roofing granules having an L* value of less than 55.
3. Colored infrared-reflective roofing granules according to claim 1 the colored infrared-reflective roofing granules having an infrared reflectance of at least 25%.
4. Colored infrared-reflective roofing granules according to claim 1 wherein the coating composition further comprises at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina.
5. Colored infrared-reflective roofing granules according to claim 1 wherein the coating composition further comprises at least one coloring material selected from the group consisting of granule coloring pigments and uv-stabilized dyes.
6. Colored infrared-reflective roofing granules according to claim 1 wherein the base particles comprise mineral particles coated with a cured base coating composition including a base particle binder, and at least one reflective white pigment.
7. Colored infrared-reflective roofing granules according to claim 6 wherein the at least one reflective white pigment is selected from the group consisting of titanium dioxide, zinc oxide and zinc sulfide.
8. Colored infrared-reflective roofing granules comprising base particles comprising inert mineral particles coated with a cured first coating composition including a base particle binder and at least one reflective white pigment, the base particles being coated with a cured second coating composition including a coating binder, and at least one colorant selected from the group consisting of uv-stabilized dyes and granule coloring pigments.
9. Colored infrared-reflective roofing granules according to claim 8, the colored infrared-reflective roofing granules having an L* value of less than 55.

10. Colored infrared-reflective roofing granules according to claim 8 the colored infrared-reflective roofing granules having an infrared reflectance of at least 25%.
11. Colored infrared-reflective roofing granules according to claim 8 wherein the second coating composition further comprises at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina.
12. Colored infrared-reflective roofing granules according to claim 8 wherein the at least one reflective white pigment is selected from the group consisting of titanium dioxide, zinc oxide and zinc sulfide.
13. Colored infrared-reflective roofing granules comprising inert mineral particles coated with a cured first coating composition including a base particle binder and at least one colorant selected from the group consisting of uv-stabilized dyes and granule coloring pigments to form base particles, the base particles being coated with a cured second coating composition including a coating binder and at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina.
14. Colored infrared-reflective roofing granules according to claim 13, the colored infrared-reflective roofing granules having an L* value of less than 55.
15. Colored infrared-reflective roofing granules according to claim 13 the colored infrared-reflective roofing granules having an infrared reflectance of at least 25%.
16. Colored infrared-reflective roofing granules according to claim 13 wherein the first coating composition further comprises at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina.
17. A bituminous roofing product comprising a substrate sheet of a fibrous material saturated with a bituminous coating material and colored, infrared-reflective roofing granules comprising base particles coated with a cured coating composition comprising a coating binder and at least one colored, infrared-reflective pigment.

18. A bituminous roofing product according to claim 17 having an L* value of less than 55.

19. A bituminous roofing product according to claim 17 having an infrared reflectance of at least 25%.

20. A bituminous roofing product according to claim 17 wherein the coating composition further comprises at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina.

21. A bituminous roofing product according to claim 17 wherein the base particles comprise mineral particles coated with a cured base coating composition including a base coating binder and at least one reflective white pigment.

22. A bituminous roofing product according to claim 21 wherein the at least one reflective white pigment is selected from the group consisting of titanium dioxide, zinc oxide and zinc sulfide.

23. A bituminous roofing product comprising a substrate sheet of a fibrous material saturated with a bituminous coating material and colored infrared-reflective roofing granules comprising base particles comprising inert mineral particles coated with a cured first coating composition including a base particle binder and at least one reflective white pigment, the base particles being coated with a cured second coating composition including a coating binder, and at least colorant selected from the group consisting of uv-stabilized dyes and granule coloring pigments.

24. A bituminous roofing product according to claim 23 having an L* value of less than 55.

25. A bituminous roofing product according to claim 23 having an infrared reflectance of at least 25%.

26. A bituminous roofing product according to claim 23 wherein the second coating composition further comprises at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina.

27. A bituminous roofing product according to claim 23 wherein the at least one reflective white pigment is selected from the group consisting of titanium dioxide, zinc oxide and zinc sulfide.

28. A bituminous roofing product comprising a substrate sheet of a fibrous material saturated with a bituminous coating material and colored infrared-reflective roofing granules comprising inert mineral particles coated with a cured first coating composition including a base particle binder and at least one colorant selected from the group consisting of uv-stabilized dyes and granule coloring pigments to form base particles, the base particles being coated with a cured second coating composition including a coating binder and at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, and mirrorized silica pigments based upon metal-doped silica.

29. A bituminous roofing product according to claim 28 having an L* value of less than 55.

30. A bituminous roofing product according to claim 28 having an infrared reflectance of at least 25%.

31. A bituminous roofing product according to claim 28 wherein the first coating composition further comprises at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina.

32. A mineral surfaced asphalt shingle having $L^* < 60$ and solar reflectance $> 25\%$.

33. A process for increasing the infrared reflectance of colored roofing granules, the process comprising:

(a) coating colored roofing granules with a coating composition including a coating binder and at least one infrared-reflective functional pigment selected from the group consisting of light-interference platelet pigments including mica, light-interference platelet pigments including titanium dioxide, mirrorized silica pigments based upon metal-doped silica, and alumina; and

(b) curing the coating binder to provide colored, infrared-reflective roofing granules.

34. A process according to claim 33, the infrared reflectance of the coated roofing granules being at least about 20 percent greater than the infrared reflectance of the uncoated roofing granules, the total color difference ΔE^* of the coated roofing granules relative to uncoated roofing granules being no more than 10 units.

35. A process for preparing a bituminous roofing product, the process comprising:

(a) saturating a sheet of fibrous material with a bituminous coating material to form a substrate, and

(b) applying infrared-reflective roofing granules to the substrate, the infrared-reflective roofing granules comprising base particles coated with a cured coating composition comprising a binder and at least one colored, infrared-reflective pigment.